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INNOVATIVE PROCESS ROUTES FOR A HIGH-QUALITY CONCRETE RECYCLING IN THE AGGREGATES AND CEMENT INDUSTRIES

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SUMMARY: This study presents alternative methods for the processing of concrete. The mechanical stresses needed for the embrittlement of the mortar matrix and further selective crushing of concrete were generated by either electric impulses or microwaves heating. Tests were carried out on lab-made concrete samples representative of concrete waste from revolving drum and on concrete waste collected on a French demolition site. The results obtained so far show that both techniques can be used to weaken concrete samples and to enhance aggregate selective liberation during crushing and grinding. Electric pulses treatment seems to appear more efficient, more robust and less energy consuming (1 to 3 kWh t⁻¹) than microwave treatment (10 to 40 kWh t⁻¹) but it can only be applied on samples in water leading to a major drawback for recycling aggregates or cement paste in the cement production process.